

545OneDrive2_00019332

EPAct Program Update for Chet France

Status and Budget

March 2, 2009

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Status of Testing and Fuel Blending

- Phase 1 testing complete
 - 75°F testing of 19 vehicles on 3 fuels (E0, E10, E15)
- Interim FTP-cycle testing complete
 - 75°F testing of 6 vehicles on 3 fuels (E0, E10, E15)
- Phase 2 testing complete
 - 50°F testing of 19 vehicles on 3 fuels (E0, E10, E15)
- Phase 3 testing expected to begin next week
 - 75°F testing of 10? (originally 19) vehicles on 27 fuels (E0, E10, E15, E20)
- Test fuel development being done by Haltermann and ASD
 - EPA defines fuel recipes
 - Haltermann prepares hand blends, bulk blends and performs fuel analyses
- 22 of the 28 fuels needed in Phase 3 have been blended in bulk
 - 13 have been delivered to SWRI

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Budget Considerations Going Forward

	Program or Project	Cost	Cumulative Cost	Difference of Total From the Original Estimate of \$4,200,000
ORIGINAL PROGRAM	Original EPart Program Budget	\$ 4,200,000	-	-
	EPart Program, February 2009 Cost Estimate	\$ 5,728,700	Ex. 4 - CBI	
	Fuel Cost Adjustment		Ex. 4 - CBI	
ADDITIONAL PROJECTS	FTP Testing (Partially Completed)			
	EFM Resolution (Completed)			
	Miscellaneous			
	Blending of Two CRC Fuels			
	Emission Testing of Two CRC Fuels			
	Grand Total			

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Budget Considerations Going Forward (Cont'd)

- Original program cost estimate: \$4,200,000
- Cost overrun wrt the original scope of program: **Ex. 4 - CBI**
- Cost overrun including additional projects: **Ex. 4 - CBI**
- Funds spent or incurred as of Feb. 19, 2009: **Ex. 4 - CBI**
- Funds "remaining" in LD EPart budget as of Feb. 19, 2009: **Ex. 4 - CBI**
- Estimated cost of Phase 3: **Ex. 4 - CBI**
- Estimated cost of testing 2 CRC fuels in Phase 3: **Ex. 4 - CBI**
- New funds needed to get us through the end of fiscal year: **Ex. 4 - CBI**

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Causes of Cost Overrun

- Unrealistically low original cost estimates by SWRI
 - Underestimation of base program cost : **Ex. 4 - CBI**
 - On January 7, 2009, SWRI was estimating base program cost overrun by 10% vs. 36.4 % on Feb. 5, 2009
 - Unexpectedly high cost of "coming up to speed" **Ex. 4 - CBI**
 - Additional checkout tests to resolve HC analyzer saturation and secondary dilution ratio issues in Phase 2: **Ex. 4 - CBI**
 - Higher than originally estimated test replication rate (+6%): **Ex. 4 - CBI**
- Fuel cost increase (modified fuel development protocol): **Ex. 4 - CBI**
- Blending of two CRC fuels: \$55,000
- Additional tasks:
 - EFM resolution: **Ex. 4 - CBI**
 - Fuel matrix redesign: **Ex. 4 - CBI**
 - FTP testing: **Ex. 4 - CBI**

Program execution problems:

- Inadequate temperature control in Phase 2 of the program
- Fuels blended for Phases 1 and 2 contained undesirable components

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Options to Reduce Cost

- Delay testing of CRC fuels: \$195,000
- Reduce the number of test fuels
 - Reduction of the number of fuels by 1 would drop the G-efficiency of emission models below the minimum acceptable limit of 50%
 - Coverage drops, fuel effects become confounded
 - The emphasis of this program is on fuels, not vehicles *between the main 5 parameters*
- Reduce the number test vehicles
 - Reduction of the number of vehicles from 19 to 15 doubles the probability of getting a non-significant result in emission models. The power of the statistical test of 0.80 is the lowest acceptable in std practice (0.95 was used in AutoOil)
 - We are working with DOE on vehicle selection
 - Reducing the number of test replicates from 2 to 1 has an even stronger impact. ~~XX~~
- Eliminate continuous THC, NOx.... measurements in raw exhaust
 - Would make critical types of information unavailable
 - Minimal savings
- Reduce the scope of exhaust HC speciation
 - The cost of HC and alcohol/carbonyl speciation: **Ex. 4 - CBI**
 - Data necessary for AQ modeling and toxic emission factors
 - Phase I and II data not adequate due to fuel blending problems

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Options to Reduce Cost (Cont'd)

- Work with SWRI to reduce program cost
- Request additional DOE support

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Back-up Slides

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Revised EPAct Fuel Matrix

Phase 3
Base Program (EPA)
(Fuels 1-16) →

Phases 1 and 2
RFS 2 Subset (EPA/DOE)
(Fuels 17-19) →

Phase 3
Additional Fuels (DOE)
(Fuels 20-29) →

E85 (DOE) →
CRC Additional Fuels →

Fuel #	T50	T90	EtOH	RVP	ARO
	°F	°F	%	psi	%
1	150	300	10	10	15
2	240	340	0	10	15
3	220	300	10	7	15
4	220	340	10	10	15
5	240	300	0	7	40
6	190	340	10	7	15
7	190	300	0	7	15
8	220	300	0	10	15
9	190	340	0	10	40
10	220	340	10	7	40
11	190	300	10	10	40
12	150	340	10	10	40
13	220	340	0	7	40
14	190	340	0	7	15
15	190	300	0	10	40
16	220	300	10	7	40
17	215	325	0	9	30
18	202	325	10	9	25
19	195	325	15	9	23
20	160	300	20	7	15
21	160	300	20	7	40
22	160	300	20	10	15
23	160	340	20	7	15
24	160	340	20	10	15
25	160	340	20	10	40
26	150	340	15	10	40
27	190	340	15	7	15
28	190	300	15	7	40
29	TBD	TBD	85	TBD	TBD
30	150	325	10	10	40
31	160	325	20	10	15

Revised
Fuels

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Light Duty Exhaust Program Summary

- EPA/DOE collaboration
- Objective: Establish effects of RVP, T50, T90, aromatic content and EtOH on exhaust emissions from Tier 2 vehicles
- Fuel matrix includes 29 fuels + 2 added by CRC = total of 31
- Test Program Design
 - Phase 1: RFS 2 Pilot at 75°F
 - 3 fuels (E0, E10 and E15) tested in 19 vehicles
 - Test results to be available for RFS 2 NPRM
 - Phase 2: RFS 2 Pilot at 50°F
 - Same as Phase 1, except temperature
 - Phase 3: Main Program
 - 27 fuels tested in 19 Tier 2 vehicles, E85 tested in 4 FFVs
- LA92 test cycle used throughout the program
- Species measured: Regulated emissions, CO₂, NO₂, VOCs, ethanol, carbonyl compounds
 - N₂O, NH₃ and HCN by FTIR
 - Some PM and SVOC speciation

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Measured Species

- Bag (phase) level and composite emissions of THC, NMHC, NMOG, CO, CO₂, NOx, NO₂, ethanol and PM
- Bag (phase) level speciated volatile organic compounds (VOCs)
 - Over 200 compounds, incl. alcohols and carbonyls
- Continuous and integrated by bag (phase) emissions of the following species in raw exhaust:
 - THC, NMHC, CO, CO₂, NOx
 - N₂O, NH₃ and HCN by FTIR for a subset of tests
- Semi-volatile and high molecular weight VOC and PM measured in Phases 1 and 2 only

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Projected Schedule Going Forward

- Launch of Phase 3 testing: Mid-February 2009
- Completion of Phase 3 testing: Early December 2009
- Reporting: December 2009 – mid-March 2010

		JAN 2009	FEB 2009	MAR 2009	APR 2009	MAY 2009	JUN 2009	JUL 2009	AUG 2009	SEP 2009	OCT 2009	NOV 2009	DEC 2009
Phase 1*	14 weeks	5 12 19 26	2 9 16 23	6 13 20 27	4 11 18 25	1 8 15 22 29	6 13 20 27	3 10 17 24 31	7 14 21 28	5 12 19 26	2 9 16 23 30	7 14 21 28	
SOF setup	3 weeks												
Phase 2*	9 weeks	4 5 6 7 8 9											
SOF teardown	2 weeks												
Phase 3*	26 weeks		1 2 3 4 5 6 7	8 9 10 11	12 13 14 15	16 17 18 19 20	21 22 23 24 25 26						
NREL fuels*	17 weeks							1 2 3 4 5 6 7	8 9 10 11	12 13 14 15 16 17			
CRC fuels	4 weeks												1 2 3
NREL high emitter	2 weeks												
draft final report	6 weeks												
EPA/NREL review	4 weeks												
final report	4 weeks												

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